Clean Copy of Claims as Amended

1. A method for desulfurizing a hydrocarbon fuel stream so as to convert the hydrocarbon fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section in a fuel cell power plant, said method comprising the steps of:

a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel sulfide;

b) introducing a hydrocarbon fuel stream which contains an oxygenate into said nickel reactant desulfurization station; and

c) said oxygenate being present in said fuel stream in an amount which is effective to provide an effluent fuel stream at an exit end of said nickel reactant station which effluent fuel stream contains no more than about 0.05 ppm sulfur by weight.

5. A method for desulfurizing a gasoline fuel stream so as to convert the gasoline fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section in a fuel cell power plant, said method comprising the steps of:

a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel sulfide;

b) introducing a gasoline fuel stream which contains an oxygenate into said nickel reactant desulfurization station; and

c) said oxygenate being present in said gasoline fuel stream in an amount which is effective to provide an effluent gasoline fuel stream at an exit end of said nickel reactant station which effluent gasoline fuel stream contains no more than about 0.05 ppm sulfur by weight.

8. A method for desulfurizing a gasoline fuel stream so as to convert the gasoline fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section of a fuel cell power plant, said method comprising the steps

of:

a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel sulfide;

b) introducing a gasoline fuel stream which contains an oxygenate into said nickel reactant desulfurization station; and

c) said oxygenate being present in said gasoline fuel stream in an amount which is effective to provide a continuous gasoline fuel stream at an exit end of said nickel reactant station which continuous gasoline fuel stream contains on average no more than about 0.05 ppm sulfur by weight.

9. A method for desulfurizing a gasoline fuel stream so as to convert the gasoline fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section in a fuel cell power plant, said method comprising the steps of:

a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel sulfide;

b) introducing a gasoline fuel stream which contains an oxygenate into said nickel reactant desulfurization station; and

c) said oxygenate being converted to isobutylene and methanol by said nickel catalyst in amounts which are effective to inhibit carbon deposition in said nickel catalyst station and provide a continuous gasoline fuel stream at an exit end of said nickel reactant station which continuous gasoline fuel stream contains no more than about 0.05 ppm sulfur by weight.

10. A method for desulfurizing a gasoline fuel stream so as to convert the gasoline fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section in a fuel cell power plant, said method comprising the steps of:

a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel sulfide;

b) introducing a gasoline fuel stream which contains an oxygenate into said nickel reactant desulfurization station, said oxygenate being present in said gasoline fuel stream in an amount which is effective to provide a low sulfur content gasoline fuel stream at an exit end of said nickel catalyst station which low sulfur content gasoline fuel stream contains no more than about 0.05 ppm by weight sulfur; and
c) said oxygenate being converted to isobutylene and methanol by said nickel reactant during said desulfurizing step, said low sulfur content gasoline fuel stream being formed so long as said nickel reactant continues to convert the oxygenate.

11. A method for desulfurizing a liquid gasoline fuel stream so as to convert the gasoline fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section in a fuel cell power plant, said method comprising the steps of:
a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel sulfide;
b) maintaining said nickel reactant desulfurization station at a temperature in the range of about 300°F to about 450°F;
c) introducing a liquid gasoline fuel stream which contains an oxygenate into said nickel reactant desulfurization station, said oxygenate being present in said gasoline fuel stream in an amount which is effective to provide a low sulfur content gasoline fuel stream at an exit end of said nickel reactant station which low sulfur content gasoline fuel stream contains no more than about 0.05 ppm by weight sulfur; and
d) said oxygenate being converted to isobutylene and methanol by said nickel reactant during said desulfurizing step, said low sulfur content gasoline fuel stream being formed so long as said nickel reactant continues to convert the oxygenate.

20. A method for desulfurizing a liquid gasoline fuel stream so as to convert the gasoline fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section in a fuel cell power plant, said method comprising the steps of:
a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel

sulfide;

b) maintaining said nickel reactant desulfurization station at a temperature in the range of about 300°F to about 450°F; and

c) introducing a mixture of a fuel cell selective oxidizer output recycle, which recycle contains hydrogen and water; and a liquid gasoline fuel, into said nickel reactant desulfurization station, said selective oxidizer output recycle being present in an amount which is effective to provide a low sulfur content gasoline fuel stream at an exit end of said nickel reactant station, which low sulfur content gasoline fuel stream contains no more than about 0.05 ppm by weight sulfur.

22. A method for desulfurizing a gaseous fuel stream so as to convert the gaseous fuel stream into a low sulfur content fuel, which low sulfur content fuel is suitable for use in a fuel processing section in a fuel cell power plant, said method comprising the steps of:

a) providing a nickel reactant desulfurization station which is operative to convert sulfur contained in organic sulfur compounds contained in the fuel stream to nickel sulfide;

b) introducing a gaseous fuel stream which contains a fuel cell selective oxidizer recycle mixture of hydrogen and water into said nickel reactant desulfurization station; and

c) said selective oxidizer recycle mixture being present in said gaseous fuel stream in an amount which is effective to provide an effluent gaseous fuel stream at an exit end of said nickel reactant station which effluent gaseous fuel stream contains no more than about 0.05 ppm by weight sulfur.

23. The method of Claim 22 wherein the gaseous fuel is selected from the group consisting of methane, ethane, propane and butane.

24. The method of Claim 22 wherein the desulfurization station operates in a temperature range of about 250°F to about 450°F.

25. The method of Claim 22 wherein said recirculated portion of the selective oxidizer output is between 1% and 10% of the total selective oxidizer output.